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Do the Ends Dictate the Means in Emotion Regulation?

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Although selecting emotion regulation strategies constitutes means to achieve emotion goals (i.e., desired emotional states), strategy selection and goals have been studied independently. We propose that the strategies people select are often dictated by what they want to feel. We tested the possibility that emotion regulation involves choosing strategies that match emotion goals. We expected people who are motivated to decrease emotional intensity to select strategies that are tailored for decreasing emotions (e.g., distraction), whereas those who are motivated to increase emotional intensity to select strategies that are tailored for increasing emotions (e.g., rumination). We expected this pattern to be evident both in the lab and in everyday life. We first verified that some strategies (i.e., distraction) are more effective in decreasing, and other strategies (i.e., rumination) more effective in increasing emotions (Study 1). Next, we tested whether emotion goals (decrease vs. increase emotion) direct the selection of strategies inside (Studies 2–3) and outside (Study 4) the laboratory. As predicted, participants were more likely to select strategies that decrease emotions (e.g., distraction, suppression) when motivated to decrease, and strategies that increase emotions (e.g., rumination) when motivated to increase negative (Studies 2–4) and positive (Study 3) emotions. Finally, in Study 5, we demonstrated that emotional dysfunction is linked to less flexibility in matching strategies to goals. Compared to healthy participants, depressed participants selected rumination less for increasing emotions and selected distraction less for decreasing emotions. Our findings show that what people want to feel can determine how they regulate emotions.

Keywords: emotion regulation, goals, strategies, choice, depression

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Emotion regulation involves changing current emotional states into desired ones, by selecting and using emotion regulation strategies. Research on desired emotional states (see Tamir, 2016) and research on emotion regulation strategies (see Sheppes & Levin, 2013; Webb, Miles, & Sheeran, 2012) have been conducted largely in parallel, assuming that what people want to feel and what they do to feel that way, are independent of each other.

We propose that the emotion goals people pursue (i.e., the ends) and the strategies they select to attain them (i.e., the means) are inherently connected. We, therefore, hypothesized that when people engage in emotion regulation, their selection of strategies would be dictated, at least to some extent, by their emotion goal. To test this prediction, we assessed the selection of emotion regulation strategies as a function of emotion goals in the laboratory, and as people regulated their emotions in their daily lives. We also tested whether difficulties in selecting strategies as a function of emotion goals are related to emotional dysfunction. By assessing the interdependency of emotion goals and emotion regulation strategies we sought to finally bridge the ends and the means in the emotion regulation process.

The Interdependence of Ends and Means in Emotion Regulation

Emotion regulation is directed by what people want to feel (Gross, 2015). For instance, people might regulate their emotions

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to increase their happiness or decrease their sadness. *Goals* are defined as the desired end-states that people are motivated to achieve by engaging in self-regulation (Gollwitzer & Moskowitz, 1996; Thrash & Elliot, 2001). We define emotion goals, therefore, as the emotional states people want to achieve when they engage in emotion regulation (Mauss & Tamir, 2014; Tamir, 2016). Effective emotion regulation involves the successful attainment of emotion goals. Emotion goals set the direction of emotion regulation by determining whether an emotion should be decreased or increased.

To decrease or increase their emotions, people need to select between emotion regulation strategies (e.g., Gross, 2015; Webb et al., 2012). Emotion regulation strategies are the specific ways in which people try to change their emotional experiences (Gross, 1998). People can select different emotion regulation strategies that are expected to have different effects on emotional experience (for reviews, see Bonanno & Burton, 2013; Gross, 2015; Parkinson & Totterdell, 1999; Sheppes & Levin, 2013; Webb, Schweiger Gallo, Miles, Gollwitzer, & Sheeran, 2012; Webb et al., 2012). Prior studies have highlighted several factors that influence the selection of emotion regulation strategies (Sheppes, Scheibe, Suri, & Gross, 2011, 2014) but did not show that it critically depends on emotion goals.

Our assumption builds on the idea that different means are tailored to attain different goals (Kruglanski et al., 2002). For instance, although people can eat with forks or spoons, these tools are tailored to consume different types of food. Whether people choose forks or spoons depends on whether they plan to have salad or ice-cream. Similarly, emotion regulation strategies are tailored to attain different emotion goals. When people want to decrease their emotions, for example, they should select strategies that are designed to decrease emotions. When they wish to increase emotions, they should select strategies that are designed to increase emotions.

We propose that different emotion regulation strategies are differentially designed for increasing and decreasing emotions, depending on the unique manner in which they operate on the emotional process. According to the extended model of emotion regulation (Gross, 2015), for instance, emotion generation involves attending to an emotion-eliciting situation, appraising it, and responding to it. People engage in emotion regulation when their emotion becomes the object of their evaluation, and they adopt a goal to change it (Gross, 2015). To change their emotional response, people can use emotion regulation strategies that target different stages of the emotion generation process (e.g., attention, appraisal, response). Strategies within each category, in turn, may operate in a manner that amplifies or attenuates emotion. For instance, there are different strategies that target the attention deployment stage of emotion generation (e.g., Gross & Thompson, 2007; Webb et al., 2012). Some attention-deployment strategies, like distraction, decrease the amount of attention directed to the emotion-inducing situation (e.g., see Naragon-Gainey, McMahon, & Chacko, 2017; van Dillen & Koole, 2007; Webb et al., 2012). Such strategies, therefore, would be expected to decrease emotion, and appear to do so (e.g., McRae et al., 2010; Shafir, Schwartz, Blechert, & Sheppes, 2015; see Sheppes & Gross, 2011, for a review). Other attention-deployment strategies, like rumination, increase the amount of attention directed to the situation (Gross, 1998; Naragon-Gainey et al., 2017; Nolen-Hoeksema, 1991; Webb et al., 2012). Such strategies, therefore, would be expected to increase emotion, and appear to do so (e.g., Bushman, 2002; Nolen-Hoeksema, Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008).

We argue that if some strategies are better tailored to decrease emotion and others are better tailored to increase emotion, selecting to use them may depend on whether people are motivated to increase or decrease their emotions. For instance, people should be more likely to select distraction when motivated to decrease their emotions, and more likely to select rumination when motivated to increase their emotional experiences. This hypothesis has never been tested. Furthermore, although strategies like rumination have received considerable attention in both the clinical and nonclinical literature, no account to date has considered emotion goals as a potential determinant of selecting such strategies.

In this investigation, therefore, we tested, for the first time, the impact of emotion goals on the selection of emotion regulation strategies. We focused primarily on distraction and rumination, as these are two distinct strategies that target the same early stage in the emotion generation process, and their mechanisms are understood as attenuating versus amplifying attention to the emotion-inducing stimulus (e.g., Lewis, Taubitz, Duke, Steuer, & Larson, 2015; Thiruchselvam, Blechert, Sheppes, Rydstrom, & Gross, 2011). These strategies are also widely used in real life (Brans, Koval, Verduyn, Lim, & Kuppens, 2013) and have previously been linked to important emotional and clinical outcomes (e.g., Lyubomirsky & Nolen-Hoeksema, 1993; Nolen-Hoeksema et al., 2008). We hypothesized that people would be more likely to select rumination when they want to increase emotions, and more likely to select distraction when they want to decrease emotions.

To show that this pattern is prevalent and characterizes emotion regulation inside and outside the lab, we sought to extend our investigation to test the dependency between emotion goals and emotion regulation strategies in daily life. We also sought to test potential links between such patterns of strategy selection and emotional dysfunction, by examining such links in clinical depression. To the extent that people vary in their tendency to select strategies to match goals in emotion regulation, we expected such variation to be linked to emotional functioning. Given that functional self-regulation involves choosing means that optimize the pursuit of one's goals (Kruglanski et al., 2002), we hypothesized that dysfunctional emotion regulation might be linked to difficulties in selecting emotion regulation strategies that optimize the pursuit of emotion goals. In particular, we expected people who suffer from emotion regulation dysfunction (such as those diagnosed with clinical depression; Joormann & Siemer, 2014), to be less likely than healthy individuals to select distraction when motivated to decrease emotions and select rumination when motivated to increase emotions. Support for these hypotheses would highlight the importance of bridging means and ends in emotion regulation.

The Current Investigation

We examined whether people select emotion regulation strategies as a function of their emotion goals (i.e., decrease vs. increase emotions). We assessed strategy selection as a function of goals as people regulated reactions to negative and positive stimuli in the laboratory. We also assessed strategy selection as a function of

goals in a daily diary study, in which people reported how they regulated their emotional reactions to negative life events. Studies 1–3 were conducted in the lab, where we manipulated emotion goals by instructing participants to either decrease or increase their emotional reactions to images. In Study 1, we verified that some strategies (i.e., rumination) are indeed more effective for increasing emotions and others (i.e., distraction) are more effective for decreasing emotions. In this study, we manipulated emotion goals (i.e., by instructing participants to either increase or decrease their emotions). We also manipulated strategies (i.e., by instructing participants to use either distraction or rumination), and tested effects on emotion regulation. In Studies 2–3, we manipulated emotion goals, but tested the effects of this manipulation on the spontaneous selection of distraction and rumination, using a behavioral performance-based paradigm. Specifically, we adopted a modified version of the emotion regulation choice paradigm (ERC; Sheppes et al., 2011, 2014), which assesses the selection of emotion regulation strategies in different contexts. In this paradigm, participants actively choose between two regulatory options, consistent with classical decision-making paradigms (e.g., Kool, McGuire, Rosen, & Botvinick, 2010; Vohs et al., 2014), minimizing biases associated with self-report methods. In Study 2, we assessed regulation of emotional responses to negative stimuli. In Study 3, we assessed regulation of emotional responses to both negative and positive stimuli.

In Study 4, to test whether findings in controlled settings extend to emotion regulation as it occurs in daily life, we analyzed data from a daily diary study that assessed emotion goals and the use of emotion regulation strategies in response to personal negative events over a weeklong period. In this study, we also expanded our focus beyond rumination and distraction, to include expressive suppression and cognitive reappraisal.

Expressive suppression is a response modulation strategy that involves minimizing the overt expression of the emotional response (Gross, 1998, 2015), and therefore, has an attenuating impact on the behavioral component of the response stage in the emotion generation process. We, therefore, expected people to be more likely to select expressive suppression when they want to decrease their emotions. Cognitive reappraisal is a strategy that targets the appraisal stage of the emotion generation process (Gross, 1998, 2015). It involves flexibly changing the interpretation ascribed to the emotional situation and could therefore be used to either amplify or attenuate appraisals attributed to the situation (e.g., Ochsner et al., 2004). Accordingly, we expected people to be more likely to select cognitive reappraisal when they want to either increase or decrease their emotions.

Finally, in Study 5 we tested whether people differ in the extent to which they select emotion regulation strategies to match emotion goals, and whether such differences are linked to emotional dysfunction. To this end, we assessed the selection of strategies (i.e., rumination, distraction) as a function of emotion goals in the laboratory, among healthy and clinically depressed individuals. We hypothesized that compared to healthy individuals, depressed individuals would be less likely to match strategies to their emotion goals.

Study 1

Because rumination amplifies the attention directed toward the emotional-inducing situation, while distraction attenuates it, and consistent with related meta-analyses (e.g., Naragon-Gainey et al., 2017; Webb et al., 2012), we expected that rumination and distraction would be differentially effective in increasing and decreasing emotional intensity. In Study 1, we tested our expectation empirically. To verify that the differential effectiveness of rumination and distraction as a function of emotion goals is not valence dependent, we assessed the regulation of emotional reactions to both sad and happy images. We focused on sadness and happiness as prototypical exemplars of negative and positive affect (e.g., Thompson et al., 2012). We also tested whether the efficacy of rumination and distraction in increasing and decreasing emotional intensity is independent of individual differences in emotionality, by testing our hypotheses with people low or high in depressive symptoms.

Method

Below we report how we determined our sample size, all data exclusions, all manipulations, and all measures that were collected in all studies.

Participants. Participants were prescreened for participation based on their score on the Beck Depression Inventory II (BDI-II; Beck, Steer, & Brown, 1996), administered online to a large sample of students ($N = 938$) 1–5 weeks prior to the study. Because of ethical review board instructions, we omitted the item "suicidal thoughts" from the screening procedure. Participants who scored either 16 or above or 9 or below on the BDI-II were invited to participate in the study (see Demiralp et al., 2012; Pe et al., 2015). During the laboratory session, we administered the BDI-II again to verify participants still met BDI-II cutoff scores.

We conducted a power analysis to verify that our tests would be sensitive enough to detect group differences. We found that a sample size of 60 participants would allow us to detect within-between interactions with an effect size of $\eta_p^2 \geq 0.04$. Anticipating that the BDI-II scores of some participants may not be consistent across the two administrations, especially for participants who scored 16 or higher in the first administration, we invited 92 participants to participate in the study, 32 participants who scored 9 or below on the BDI-II, and 60 participants who scored 16 or higher. The final sample included 60 students (42 women, 18 men, $M_{age} = 24.05$), 29 dysphoric participants (*MBDI-II* = 22.69,[1] $SD = 4.68$), and 31 nondysphoric participants (*MBDI-II* = 2.61 (see Footnote 1), $SD = 2.64$), who received course credit or the equivalent of $13 for participating. Thirty-two participants were excluded for not meeting BDI-II cutoffs in the second administration. The dysphoric and nondysphoric groups did not differ significantly by age, $t(58) = -0.62$, $p = .540$; family status, $\chi^2(3) = 4.96$, $p = .175$; or gender, $\chi^2(1) = 0.918$, $p = .338$.

Procedure. To assess participants' initial emotional reactions to the images used in the study, upon arrival to the lab, participants first viewed 20 sad images and 20 happy images and rated the extent to which the sad images made them sad, and the happy images made them happy (1 = not at all, 9 = extremely). After rating their emotional reactions to the images, participants underwent a training phase. During the training, the experimenter explained to participants that they would be instructed to decrease or increase their emotional reactions to the images they had previ-

[1] Mean BDI-II scores in the second administration.

ously rated. The experimenter explained to participants that when instructed to decrease their emotional reaction to an image, their goal is to make their emotional reaction to the image less intense. In contrast, when instructed to increase their emotional reaction, their goal is to make their emotional reaction more intense.

Next, participants were trained in using distraction and rumination. To train participants to use distraction, we used instructions similar to those used by Sheppes and colleagues (2014). However, because we sought to introduce distraction as a strategy that is not inherently linked to a specific direction of regulating emotions (e.g., decrease), instead of instructing participants to think about neutral content, we asked participants to think about content which was unrelated to the presented image (the full instructions are available in the online supplementary materials). To train participants to use rumination, we used instructions similar to those used by Ray, Wilhelm, and Gross (2008). We instructed participants to repeatedly focus on the image and think of the reasons they feel the way they do (e.g., Gross & Thompson, 2007; Ray et al., 2008). The order in which the strategies were introduced was counterbalanced across participants. To ensure adequate understanding, participants were requested to implement each of the strategies four times: to decrease their emotional reaction to a sad image, to decrease their emotional reaction to a happy image, to increase their emotional reaction to a sad image, and to increase their emotional reaction to a happy image. The order in which participants completed the training trials was counterbalanced across participants. If participants experienced difficulties implementing a strategy in the specified direction of regulation, the experimenter told them that the strategies do not always work as intended, but it is important that they keep using the strategies as instructed.

Next, participants were trained on a strategy implementation task that measured the efficacy of instructed regulatory strategies in modulating affect. The experimenter demonstrated how to complete one sample trial. Then, participants completed two sample trials (one "decrease" trial and one "increase" trial, in counterbalanced order). During these trials, participants needed to tell the experimenter how they used the strategy they were instructed to use. The experimenter then left the room, and participants completed the strategy implementation task (see Figure 1 for a depiction of a typical trial). On each trial of the task, an instruction to either decrease or increase the emotional response appeared at the center of the screen and participants pressed a key to continue. Then, a fixation cross appeared at the center of the screen for 1,500 ms followed by an image, which was presented for 500 ms. After the offset of the image, an instruction to either use distraction or rumination appeared at the center of the screen and participants pressed a key to continue. Next, participants were given 2,000 ms to prepare, then the same image reappeared for 5,000 ms and participants needed to implement the strategy. After image offset, participants indicated how sad or happy they felt in response to the image. To verify that participants adhered to the instructions, on 40% of the trials, after rating their emotional response, participants were asked to explain in writing how they used the instructed strategy.[2] The images in the strategy implementation task were randomly assigned to each experimental condition, with equal number of images in each condition. Participants completed two experimental blocks, one block with sad images and one block with happy images. We used separate blocks for sad and happy images to minimize contamination effects (see Hay, Sheppes, Gross, & Gruber, 2015). The order of blocks was counterbalanced across participants. Finally, participants provided demographic information.[3]

Materials. Forty images (20 sad and 20 happy) were used in the strategy implementation task. We selected images from the International Affective Picture System (IAPs; Lang, Bradley, & Cuthbert, 2005), based on published norms (Lang et al., 2005; Mikels et al., 2005). We selected 12 sad images that were rated as inducing moderate sadness ($M_{sadness}$ = 4.64, SD = 0.55), and eight additional sad images that were found to induce sadness in prior experiments ($M_{sadness}$ = 6.11, SD = 1.11; e.g., Millgram, Joormann, Huppert, & Tamir, 2015; Vishkin et al., 2016). We selected 20 happy images that were rated as inducing moderate amusement and contentment ($M_{amusement}$ = 4.33, SD = 0.57; $M_{content}$ = 4.22, SD = 0.39).

Results and Discussion

Manipulation checks. To examine emotional reactions to the sad and happy images prior to regulation, we averaged participants' ratings of sadness in response to sad images and happiness in response to happy images, prior to the regulation phase. As expected, the sad images induced moderate sadness (M = 5.99, SD = 1.61) and the happy images induced moderate happiness (M = 5.61, SD = 1.51). There were no group differences in the initial emotional reactions to images as a function of dysphoria, $F(1, 58) = 0.126$, $p = .724$, $\eta_p^2 < 0.01$, and $F(1, 58) = 0.430$, $p = .514$, $\eta_p^2 < 0.01$, for sad and happy images, respectively.

To confirm that participants used distraction and rumination appropriately, a rater who was blind to the strategy instructions rated participants' written descriptions of their strategy use. Participants used rumination appropriately on 94.9% of the trials in which a written description of strategy use was provided. Participants used distraction appropriately on 95.6% of the trials in which a written description of strategy use was provided. These results indicate that participants implemented rumination and distraction according to instructions. Dysphoric and nondysphoric participants did not differ in the percent of trials in which they appropriately used distraction (95.8% and 95.4% for dysphoric and nondysphoric, respectively), $t(55) = -0.21$, $p = .831$, or rumination, $t(55) = 0.74$, $p = .463$ (94% and 95.8% for dysphoric and nondysphoric, respectively).

Strategy efficacy as a function of emotion goals. Table 1 in the online supplementary materials describes means of emotional reactions to images before and after regulation as a function of image type, emotion goals, emotion regulation strategies, and dysphoria. To test whether the effectiveness of rumination and distraction depended on the emotion goal pursued, we conducted a repeated-measures analysis of variance (ANOVA) with image type (sad, happy), goal (increase, decrease) and strategy (rumination, distraction) as within-subject factors and order of blocks as a between subjects factor. The difference between emotional reactions prior to regulation and after regulation served as the dependent variable. As expected, we found a significant Goal × Strategy interaction, $F(1, 58) = 9.74$, $p = .003$, $\eta_p^2 = 0.14$ (see Figure 2).

[2] Three participants did not provide written descriptions.

[3] Results were not moderated by demographic variables, such as age and gender.

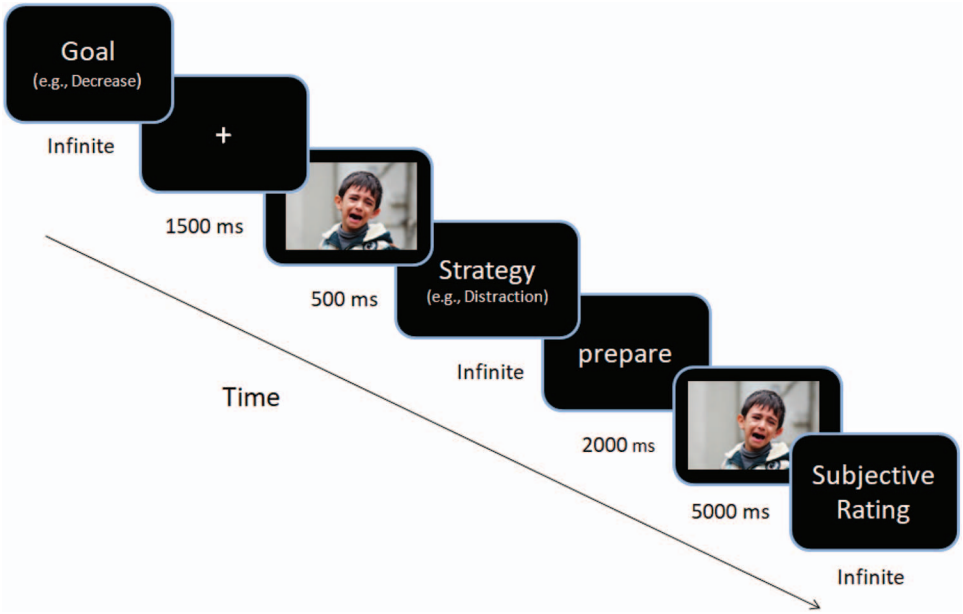

Figure 1. The content of a typical trial in the strategy implementation task (Study 1). To avoid violation of copyrights, in this figure we used an image that was downloaded from the Internet and was approved for public use, for demonstration purposes (https://www.maxpixel.net/Child-Boy-Sad-Unhappy-Kid-Iraq-Young-Crying-594519). See the online article for the color version of this figure.

When participants were instructed to increase their emotional reaction they were more effective using rumination ($M = 0.73$, $SE = 0.09$), compared to distraction ($M = 0.47$, $SE = 0.13$), $F(1, 58) = 4.96$, $p = .030$, $\eta_p^2 = 0.08$. In contrast, when participants were instructed to decrease their emotional reaction they were more effective using distraction ($M = -1.28$, $SE = 0.13$), compared to rumination ($M = -0.54$, $SE = 0.14$), $F(1, 58) = 43.40$, $p < .001$, $\eta_p^2 = 0.43$. These findings show that distraction is indeed more effective for decreasing emotional responses, whereas rumination is more effective for increasing emotional responses. There was no Goal × Strategy × Image Type interaction, $F(1, 58) = 0.48$, $p = .493$, $\eta_p^2 < 0.01$, indicating that effects did not vary by valence.[4]

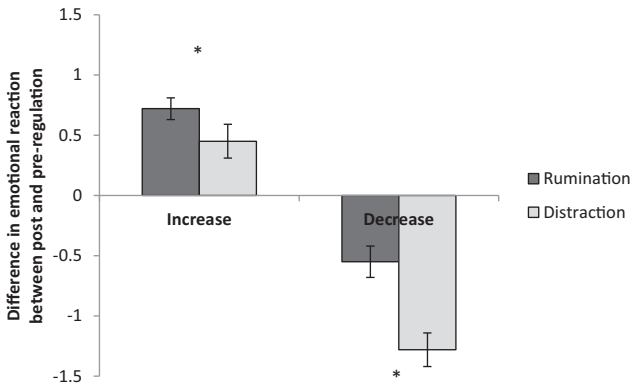

Figure 2. Pre- and postregulation differences in emotional reactions as a function of emotion goals and emotion regulation strategy. Error bars refer to +/−1 standard errors of the mean (Study 1).

When repeating the analysis with dysphoria as an additional between subjects predictor, there was no Goal × Strategy × Dysphoria interaction, $F(1, 56) = 0.02$, $p = .890$, $\eta_p^2 < 0.01$, and the Goal × Strategy interaction remained significant, $F(1, 56) = 9.36$, $p = .003$, $\eta_p^2 = 0.14$. This indicates that Dysphoria did not moderate these effects. Rumination was more effective for increasing emotions and distraction for decreasing emotions, among people with high or low levels of depressive symptoms.

We also found a Goal × Image Type interaction, $F(1, 58) = 33.96$, $p < .001$, $\eta_p^2 = 0.37$, such that participants were more effective in increasing reactions to happy ($M = 0.81$, $SE = 0.13$) than sad images ($M = 0.40$, $SE = 0.11$), and more effective in decreasing reactions to happy ($M = -1.06$, $SE = 0.14$) than sad images ($M = -0.76$, $SE = 0.14$). These findings indicate that regardless of the strategy used, participants were more effective in regulating their emotions in reaction to happy images.

[4] Our findings qualified a significant main effect for goal, $F(1, 58) = 133.66$, $p < 0.001$, $\eta_p^2 = 0.70$, such that on average, when participants were instructed to increase their emotional response their emotional reactions increased ($M = 0.60$, $SE = 0.09$), and when participants were instructed to decrease their emotional reactions their reactions decreased ($M = -0.91$, $SE = 0.12$). Our findings also qualified a significant main effect for strategy, $F(1, 58) = 33.69$, $p < 0.001$, $\eta_p^2 = 0.37$, such that regardless of the goal of regulation, distraction tended to decrease emotional reactions ($M = -0.40$, $SE = 0.11$, significantly lower than zero, $p < 0.001$), and rumination did not ($M = 0.09$, $SE = 0.08$, not significantly different than zero, $p = 0.334$). We unexpectedly found a main effect for order of blocks, $F(1, 58) = 5.33$, $p = 0.025$, $\eta_p^2 = 0.08$, which was qualified by a Goal × Strategy × Order interaction, $F(1, 58) = 4.80$, $p = 0.032$, $\eta_p^2 = 0.08$. When participants were instructed to increase their emotional reactions and used distraction, they succeeded more in doing so when they regulated reactions to sad images first ($M = 0.89$), compared to when they regulated reactions to happy images first ($M = 0.06$).

Taken together, the results of Study 1 indicate that, as expected, rumination was more effective in increasing emotions and distraction was more effective in decreasing emotions. This pattern was not qualified by stimulus valence or dysphoria.

Study 2

In Study 1, we tested the efficacy of rumination and distraction as a function of emotion goals, by instructing participants to implement either rumination or distraction, and testing their impact on emotional experience. In subsequent studies, however, we focused on strategy selection. We tested whether the selection of emotion regulation strategies depends on the emotion goal pursued. In Study 2, participants chose between rumination and distraction when they were instructed to either increase or decrease their reactions to negative stimuli. We expected participants to choose rumination to increase emotions, and distraction to decrease emotions.

Method

Participants. Thirty-seven participants (32 women, five men, $M_{age} = 22.72$) participated in the study. Because previous studies assessing emotion regulation strategy choice found very large effects (e.g., $\eta_p^2 = 0.75$, Sheppes et al., 2011, 2014), a priori power analysis pointed to an unacceptably small sample size (i.e., four participants). Therefore, based on sample sizes previously used in studies assessing the selection of emotion regulation strategies (e.g., Sheppes et al., 2014) we set the sample size to 30 participants. To ensure we reach this sample size, we oversampled by ~20%. No participants were excluded.[5]

Procedure. To ensure participants had the expected emotional reactions to the images used in the study, upon arrival to the lab, participants first viewed 40 negative images and rated how negatively they felt in response to each image from 1 (*not at all negative*) to 9 (*extremely negative*). After rating their emotional reactions to the images, participants underwent a training phase that was identical to the training phase in Study 1.

Next, participants were trained on the strategy selection task. The experimenter demonstrated how to complete one sample trial. Then, participants completed two sample trials, in which they selected between distraction and rumination (one "decrease" trial and one "increase" trial, in counterbalanced order). During these trials, participants also needed to tell the experimenter how they used the strategy they selected. The experimenter then left the room, and participants completed the behavioral strategy selection task (see Figure 3 for a depiction of a typical trial).

On each trial, an instruction to either decrease or increase the emotional response appeared at the center of the screen and participants pressed a key to continue. Then, a fixation cross appeared at the center of the screen for 1,500 ms followed by an image, which was presented for 500 ms. After the offset of the image, participants hit the 1 or the 9 key to choose whether to use distraction or rumination to regulate their emotions on that trial (the assignment of keys to strategies were counterbalanced across trials). After making their selection, participants were given 2,000 ms to prepare, then the image appeared again for 5,000 ms and participants needed to implement their selected strategy. After image offset, to ensure they actually engaged in regulation, participants indicated how negatively they had felt in response to the image. To verify that participants adhered to their behavioral regulatory choices, on 20% of the trials, after rating their emotional response, participants explained in writing how they used their selected strategy. The task included 40 negative images that were presented in a random order. On half of the trials, participants were instructed to decrease their emotional reaction and on half of the trials, they were instructed to increase their emotional reaction. After they completed the strategy selection task, participants completed several trait questionnaires in random order.[6]

Materials. Forty images from the IAPs (Lang et al., 2005) were used in the strategy selection task. We selected images with moderate levels of negativity and arousal ($M_{valence} = 3.41$, $SD = 0.28$, $M_{arousal} = 4.86$, $SD = 0.68$, on 1–9 scales) to ensure participants could potentially decrease and increase their emotional reactions to these images. Selecting images with moderate intensity was also important so that participants would not be biased toward distraction, which is more likely to be selected in response to high intensity emotional stimuli (e.g., Sheppes et al., 2011, 2014).

Results and Discussion

Manipulation checks. We averaged participants' ratings of all images prior to regulation. The mean negativity ratings ($M = 4.64$, $SD = 1.09$) indicated that the images induced moderate negative affect, as expected. To confirm that participants used rumination and distraction appropriately during the selection task, a rater who was blind to the strategies selected, rated participant's written descriptions of their strategy use. Participants used rumination appropriately on 96.9% of the trials in which rumination was selected and a written description of strategy use was provided. Participants used distraction appropriately on 95.2% of the trials in which distraction was selected and a written description of strategy use was provided. These results indicate that participants correctly implemented the strategy of their choice.

Finally, to confirm participants engaged in regulation in the expected direction, we subtracted image ratings prior to regulation from image ratings postregulation, when participants were instructed to decrease their emotional response, and when they were instructed to increase it. When participants were instructed to decrease their responses, the average difference between pre and postregulation ratings was negative, and significantly different from zero, $M = -1.21$, $t(36) = -7.06$, $p < .001$, indicating that participants indeed decreased their emotional reactions. Similarly, when participants were instructed to increase their responses, the average difference between pre- and postregulation ratings was positive, and significantly different from zero, $M = 0.76$, $t(36) =$

[5] One participant did not complete the questionnaires and demographic information at the end of the experiment.

[6] Participants completed the rumination and distraction subscales of the Response Style Questionnaire (RSQ; Nolen-Hoeksema & Morrow, 1991) to assess trait rumination and distraction, implicit theories of emotion scale (see Tamir, John, Srivastava, & Gross, 2007), emotional preferences scale (e.g., see Tamir & Ford, 2012), the BDI-II (Beck et al., 1996), and provided demographic information. Trait rumination and distraction were unrelated to choices to use rumination and distraction as a function of goals, $r_s(36) < 0.246$, $p > 0.148$. Trait rumination and distraction and demographic variables such as age and gender did not moderate the results.

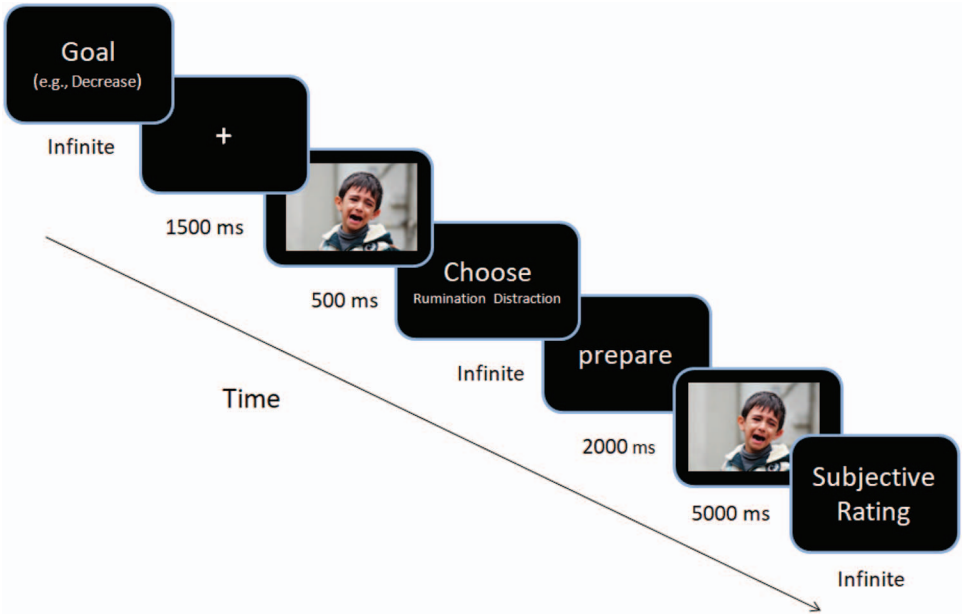

Figure 3. The content of a typical trial in the strategy selection task (Study 2). To avoid violation of copyrights, in this figure we used an image that was downloaded from the Internet and was approved for public use, for demonstration purposes (https://www.maxpixel.net/Child-Boy-Sad-Unhappy-Kid-Iraq-Young-Crying-594519). See the online article for the color version of this figure.

3.90, $p < .001$, indicating that participants increased their emotional reactions.

Goal-dependent behavioral strategy selection. To test whether the selection of emotion regulation strategy depended on the given emotion goal, we conducted a paired-samples t test, with goal (decrease, increase) as the independent variable. We used the percent of trials in which rumination was selected (which is the inverse of the percent of trials in which distraction was selected) as the dependent variable. As predicted, we found a strong difference in strategy selection, as a function of emotion goal, $t(36) = 10.93$, $p < .001$, $d = 3.21$ (see Figure 4). When participants were instructed to decrease their emotional reaction they chose distraction on 70.3% of the trials (95% CI: [63.24, 77.30]), and when instructed to increase their emotional reaction they chose rumination on 85.7% of the trials (95% CI: [81.14, 90.21]). These results show, for the first time, the interdependence between goals and strategies in emotion regulation. Participants strongly preferred distraction to decrease emotions and rumination to increase emotions.

Study 3

Following studies on emotion regulation choice that found parallel effects across negative and positive valence (e.g., Hay et al., 2015; Martins, Sheppes, Gross, & Mather, in press; Sheppes et al., 2014), we expected participants to select rumination to increase, and distraction to decrease, reactions to both negative and positive images. To test this in Study 3, participants regulated reactions to sad and happy images.

Method

Participants. The study included 30 participants (18 women, 12 men, $M_{age} = 23.97$). Because we found a very strong effect in

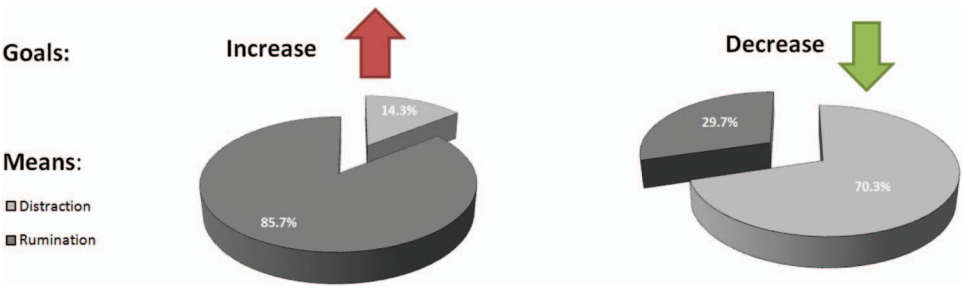

Figure 4. Percentage of selections of distraction and rumination as a function of emotion goals (Study 2). See the online article for the color version of this figure.

Study 2 (i.e., $d = 3.21$), an a priori power analysis indicated an unacceptably small sample size (i.e., four participants). We therefore conservatively set the sample size to 30 participants as in Study 2. Because we eventually did not exclude any participants in Study 2, we did not oversample in Study 3. Indeed, no participants were excluded.

Procedure. The procedure was identical to that of Study 2, except for the following modifications. First, the task included 30 sad images and 30 happy images. Before watching the images in the experimental phase, participants rated the extent to which the sad images made them sad, and the happy images made them happy on a scale from 1 (*not at all*) to 9 (*extremely*). Then, participants proceeded to the training phase. Second, to confirm that participants received sufficient training before proceeding with the task, we modified and expanded the training phase of the study. As in Studies 1–2, the experimenter first explained the meaning of the goal instructions to "decrease" and to "increase" the emotional response. Then, in addition to the explanation provided in Study 2, in Study 3 the experimenter also asked participants to explain in their own words what their goal would be when instructed to decrease their reaction and when instructed to increase their reaction to an image. Next, the experimenter introduced distraction and rumination (in counterbalanced order). The instructions for distraction and rumination used in Study 2 were slightly modified and equated on length and on the amount of detail provided by the experimenter (see the online supplementary materials).

The instructions for rumination were similar to those in Study 2, only the experimenter told participants not to ascribe a different interpretation to the image. To further verify that participants realized that both strategies can be equally used for both goals, the experimenter also told participants that each of the two strategies can be used to increase and to decrease emotions. Participants were told that rumination can be used to decrease emotional intensity because it involves processing and "working through" the emotional experience, and it can be used to increase emotional intensity due to the extensive focus on one's feelings. Similarly, participants were told that distraction can be used to decrease emotional intensity because it involves shifting one's attention away from the emotional situation, and it can be used to increase emotional intensity because it hinders the processing of one's feelings.

Participants completed eight training trials. On each trial, an image was presented, followed by the emotion goal (i.e., decrease, increase). Participants were requested to implement each of the strategies four times: to decrease their emotional reaction to a sad image, to decrease their emotional reaction to a happy image, to increase their emotional reaction to a sad image and to increase their emotional reaction to a happy image. The order in which participants completed the training trials was counterbalanced across participants.

After these training trials, participants were also trained in completing the strategy selection task, as in Study 2. The strategy selection task included one block with sad images and one block with happy images. The order of blocks was counterbalanced across participants. As opposed to 20 trials for each goal in Study 2, in Study 3 participants completed 15 trials in each experimental condition. The trial composition was the same as in Study 2. Participants took a 5-min break between the two blocks. After participants completed the task, they completed the same questionnaires participants completed in Study 2.[7]

Materials. The task included 30 sad images and 30 happy images. We selected images from IAPs (Lang et al., 2005), based on published norms of discrete emotions (Lang et al., 2005; Mikels et al., 2005). We selected 18 images that induced moderate levels of sadness ($M_{sadness} = 4.06$, $SD = 1.75$) and 12 additional images that were found to induce sadness ($M_{sadness} = 5.90$, $SD = 2.32$) in previous experiments (Millgram et al., 2015; Vishkin et al., 2016). We also selected 30 images that induced moderate levels of amusement and contentment ($M_{amusement} = 4.15$, $SD = 1.80$; $M_{contentment} = 4.14$, $SD = 1.67$).

Results and Discussion

Manipulation checks. We averaged participants' ratings of sadness in response to sad images and happiness in response to happy images, prior to the regulation phase. As expected, the sad images induced moderate sadness ($M = 5.49$, $SD = 1.73$) and the happy images induced moderate happiness ($M = 5.83$, $SD = 1.59$). The sad and happy images did not differ in emotional intensity, $t(29) = -1.17$, $p = .253$. To confirm that participants used rumination and distraction appropriately, a rater who was blind to strategy selection rated participant's written descriptions of their strategy use. Participants used rumination appropriately on 97.2% of the trials in which rumination was selected and a written description of strategy use was provided, and distraction appropriately on 93.9% of the trials in which distraction was selected.

Finally, to confirm that participants engaged in regulation in the expected direction, we subtracted image ratings before regulation, from image ratings after regulation. When participants were instructed to decrease their responses, the average difference between pre- and postregulation ratings was negative and significantly different from zero, $M = -0.88$, $t(29) = -3.70$, $p = .001$, indicating that participants decreased their emotional reactions. When participants were instructed to increase their responses, the average difference between pre- and postregulation ratings was positive and significantly different from zero, $M = 0.81$, $t(29) = 5.12$, $p < .001$, indicating that participants increased their emotional reactions.

Strategy selection. We conducted a repeated-measures ANOVA with image type (sad, happy) and goal (increase, decrease) as within-subject factors, and order of blocks as a between-subjects factor. The percent of trials in which rumination was selected served as the dependent variable. As predicted, and replicating findings from Study 2, we found a significant main effect for goal, $F(1, 28) = 60.74$, $p < .001$, $\eta_p^2 = 0.68$ (see Figure 5). When participants were instructed to decrease their emotional reaction they chose distraction on 69.9% of the trials (95% CI: [62.56, 77.22]), and when instructed to increase their emotional reaction they chose rumination on 74.8% of the trials (95% CI: [67.50, 82.06]). Repli-

[7] As in Study 2, trait rumination and distraction were unrelated to choices to use rumination and distraction as a function of goals, $r_s(30) < 0.287$, $p > 0.124$. Trait rumination and distraction and demographic variables such as age and gender did not moderate the results.

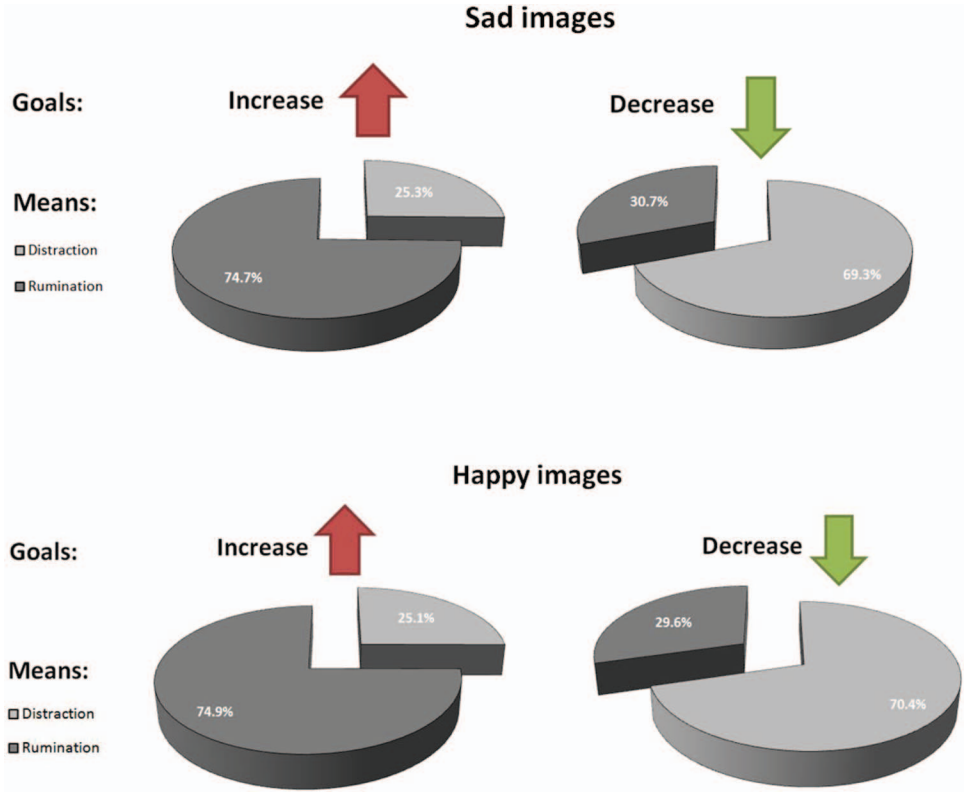

Figure 5. Percentage of selections of distraction and rumination as a function of emotion goals and image type (Study 3). See the online article for the color version of this figure.

cating prior studies (Hay et al., 2015; Martins et al., in press) the Goal × Image Type interaction was clearly not significant, $F(1, 28) = 0.07$, $p = .799$, $\eta_p^2 < 0.01$, indicating that this pattern of strategy selection was independent of valence. There was no main effect for image type, $F(1, 28) = 0.06$, $p = .812$, $\eta_p^2 < 0.01$. These findings show that people select distraction to decrease emotions and rumination to increase emotions regardless of whether these emotions are negative or positive. We found no order effects, $F_s < 1.06$, $ps > 0.312$.

Study 4

In Studies 2–3, we assessed strategy selection as a function of emotion goals in the laboratory. This enabled us to establish the causal relationship between goals and strategies in emotion regulation. However, the findings in these studies are constrained to an artificial laboratory context. In Study 4, we sought to test the generalizability of our findings by assessing the potential interdependency of emotion goals and emotion regulation strategies outside the lab, as people regulate emotions in their daily lives. We used data from a daily diary study, in which participants reported on their emotion goals and strategy use in response to personally relevant negative events over a period of 7 consecutive days. Participants completed the diary at the end of each day. They reported on the most negative event they experienced that day, their use of emotion regulation strategies and their emotion goals in response to the event. We focused on regulating emotions in response to negative events, as emotion regulation is more common in response to negative events (e.g., Brans et al., 2013; Gross, Richards, & John, 2006; Riediger, Schmiedek, Wagner, & Lindenberger, 2009). We expected the patterns we found when examining emotion regulation in the laboratory to replicate when examining emotion regulation in daily life. Specifically, we predicted that people would be more likely to use rumination to increase emotions and distraction to decrease emotions.

In Studies 2–3, we focused solely on two regulatory strategies. In Study 4, we extended our focus to include two additional extensively studied emotion regulation strategies-namely, expressive suppression and cognitive reappraisal (Gross, 2015). We expected people to be more likely to select expressive suppression when they want to decrease their emotions, and more likely to select cognitive reappraisal when they want to either increase or decrease their emotions.

In the lab, we focused on the goals of increasing versus decreasing emotional reactions. However, outside the laboratory people may also be motivated to maintain their emotional reactions. Because emotions tend to naturally fade away over time (e.g., Hemenover, 2003), we expected that attempts to actively maintain emotional reactions would involve similar processes as increasing emotions. Therefore, we assessed the goals of increasing or maintaining emotional reactions versus decreasing emotional reactions.

Method

Data were collected as part of a larger study.[8] In the next section, we describe the parts of the protocol that are relevant to the current research questions, a list of all measures in the dataset can be provided upon request.

Participants. One hundred and 14 participants (57 women, 57 men, $M_{age} = 35.23$, $SD_{age} = 11.87$) from the United States were recruited through Amazon's Mechanical Turk and completed 771 daily diaries. Participants were selected to maximize variation on neuroticism, allowing us to investigate these phenomena over a wide range of negative emotional response styles (for more details on the selection method, see Kalokerinos, Tamir, & Kuppens, 2017). Participants were paid for their participation ($0.60 for the recruitment survey, $2 for the baseline survey, $1 per diary completed, and a $3 bonus when all 7 daily surveys were completed).

The sample originally consisted of 121 participants. We excluded one of these participants for missing more than half of the five attention checks distributed throughout the study (described below). Among the remaining sample, mean completion was high, with participants completing an average of 6.63 of seven diaries. However, six participants completed less than 4 days, and we excluded these participants because they were missing more than 50% of the daily data.[9] The final sample of 114 participants originally completed 784 diaries, but 13 diaries were excluded because participants could not recall a negative event, leaving the 771 diaries used in analyses.

We initially aimed to recruit 120 participants. A power analysis suggested a sample size of 80 to detect medium effect sizes ($r = .30$) at 80% power (when $\alpha = .05$), and we oversampled to meet this target.

Procedure. The study involved a recruitment survey (to target high variability in neuroticism), a baseline survey, and seven consecutive daily surveys. All the variables used in the current analyses were drawn from the daily surveys. Participants received a link to the online daily survey each day at 7 p.m. in their time zone and were asked to complete the survey that evening. The daily survey took approximately 5 min to complete. At the beginning of the daily survey, we gave participants the following instructions: "First, we'd like you to recall the most negative event you experienced today. That is, the event that led to the most negative emotions. Please write a sentence or two describing this event in the space provided below." We then asked participants to answer a series of questions about the negative event they recalled, keeping the event in mind throughout the survey. First participants reported on the extent to which they used different emotion regulation strategies in response to the event. Second, participants rated their emotion goals regarding the event. To ensure that participants were attending to the study questions, we included attention checks throughout the course of the study.

Materials

Emotion regulation strategies. We asked participants to report how much they used a number of emotion regulation strategies on a 7-point scale ranging from 1 (*I did not do this at all*) to 7 (*I did this very much*). The items were adapted from the items used in Brans et al. (2013). The strategies we focus on here were distraction ("I distracted myself from the event or my emotions"), rumination ("I ruminated or dwelled on the event or my emotions"), expressive suppression ("I suppressed the outward expression of my emotions"), and cognitive reappraisal ("I changed my perspective or the way I was thinking about the event").[10]

Emotion goals. To assess emotion goals, participants were asked, "What were your goals in trying to influence your emotions? Please select all that apply". Participants could select (or not select) any response option. The options were "to reduce my negative emotions" or "to maintain or increase my negative emotions." The response options were coded dichotomously, where 0 = not selected and 1 = selected.

Attention checks. To ensure that participants were attending to the study questions, we included three attention checks over the course of the daily surveys. We included attention checks in the surveys for Day 1, Day 4, and Day 7. The attention check item was "This is a control item. Please select . . ." and then either "1" or "7". Participants who did not select the number specified failed that attention check.

Results

Descriptive statistics and correlations between study variables are presented in Table 1. The data are multilevel (negative events nested within persons), and so we used the lme4 package in R (Bates, Mächler, Bolker, & Walker, 2015) to fit linear mixed effects models to analyze the data. *p* values were calculated using the lmerTest package in R, which uses a Satterthwaite approximation for degrees of freedom (Kuznetsova, Brockhoff, & Christensen, 2013).

We ran separate models for each of the two emotion regulation goals (increase/maintain and decrease) and each of the four emotion regulation strategies (rumination, distraction, expressive suppression, and reappraisal), so that there were eight models in total. In each model, we modeled a fixed effect of the uncentered dichotomous negative emotion goal variable (0 = goal not pursued, 1 = goal pursued) to predict each emotion regulation strategy. We included both random intercepts and slopes of the emotion goals variable. The equations below outline these models:

Level 1—Event level:

$$\text{Emotion regulation strategy}_{1j} = \beta_{0j} + \beta_{1j}(\text{Emotion regulation goal}) + r_{ij}$$

Level 2—Person level:

$$\beta_{0j} = \gamma_{00} + \mu_{0j}$$
$$\beta_{1j} = \gamma_{10} + \mu_{1j}$$

Rumination. The results of these analyses are summarized in Table 2. Consistent with the results in Studies 1–3, we found that

[8] Subsets of these data have been used to address different research questions in Kalokerinos, Résibois, Verduyn, and Kuppens (2017); Kalokerinos et al. (2017), and Résibois et al. (2018)

[9] Results do not change substantively when these participants are included.

[10] Participants also rated how much they took steps to change the situation. It was not sufficiently clear whether the item referred to changing the emotion-eliciting situation with the intent to change the emotional experience. We therefore did not assess the selection of this item in the current investigation.

Table 1
Descriptive Statistics and Correlations Between Variables in Study 4

Variable	1	2	3	4	5	6	ICC	*M*	Between-person *SD*	Within-person *SD*
1. Decrease negative goal	—	−.17***	.04	.26***	.14***	.14***	.30			
2. Increase/maintain negative goal	−.03	—	.11***	−.06	−.05	−.02	.27			
3. Rumination	.11	.20*	—	−.01	.08*	−.07*	.33	3.14	2.01	1.67
4. Distraction	.26***	−.07	.10	—	.28***	.25***	.20	3.02	1.94	1.43
5. Expressive suppression	.36***	.00	.08	.33***	—	.14***	.26	3.35	2.14	1.50
6. Cognitive reappraisal	.23**	.04	.02	.39***	.17	—	.29	2.67	1.92	1.60

Notes. Correlations above the diagonal are within-person correlations. Correlations below the diagonal are between-person correlations. Correlations were calculated using the statsBy function of the psych package in R (Revelle, 2017). Within-person correlations represent the correlation between a participant's temporal deviations on a pair of variables, averaged across participants (Curran & Bauer, 2011). Between-group correlations are correlations between a participant's mean on a pair of variables, weighted by the number of completed diaries for that participant. ICC = intraclass correlation, which represents the proportion of variance at the between-person level. For the dichotomous goals variables, we calculated the ICC using the method recommended by Snijders and Bosker (2012) for logistic models. For more descriptive information see Table 1 of Kalokerinos, Tamir, and Kuppens (2017).
* $p < .05$. ** $p < .01$. *** $p < .001$.

people who tried to increase or maintain negative emotions (vs. those who did not) were significantly more likely to use rumination, $\gamma = 2.06$, $SE = 0.58$, $p = .005$. In contrast, the use of rumination was unrelated to trying to decrease negative emotions, $\gamma = 0.21$, $SE = 0.17$, $p = .211$.

Distraction. As predicted, and consistent with the findings in Studies 2–3, when predicting the use of distraction as a function of emotion goals we found that people who tried to decrease negative emotions were more likely to use distraction $\gamma = 1.09$, $SE = 0.16$, $p < .001$. In contrast, the use of distraction was unrelated to trying to increase or maintain negative emotions, $\gamma = -0.87$, $SE = 0.53$, $p = .108$.

Expressive suppression. As predicted, we found that people who tried to decrease their negative emotions were more likely to use suppression, $\gamma = 0.81$, $SE = 0.16$, $p < .001$. Suppression was unrelated, however, to attempts to increase or maintain negative emotions, $\gamma = -0.64$, $SE = 0.55$, $p = .243$.

Cognitive reappraisal. Finally, people who tried to decrease their negative emotions were more likely to use reappraisal, $\gamma = 0.64$, $SE = 0.15$, $p < .001$. Counter to our predictions, reappraisal was unrelated to attempts to increase or maintain negative emotions, $\gamma = -0.14$, $SE = 0.55$, $p = .796$.

Study 5

Study 5 was designed to address two interrelated questions. First, the results of Studies 2–3 imply that people are quite skilled in selecting emotion regulation strategies to optimize the pursuit of emotion goals. However, we expected that this may not apply uniformally across individuals. Therefore, in Study 5 we tested whether people differ from one another in the extent to which they select strategies according to emotion goals. Second, functional self-regulation involves selecting means that are appropriate to achieving one's goals (e.g., Kruglanski et al., 2002). By extension, dysfunction in emotion regulation may characterize people who are less skilled in selecting strategies according to goals in emotion regulation. Therefore, in Study 5 we tested whether people who suffer from dysfunctional emotion regulation are less likely to select strategies that match emotion goals. We compared strategy choice (i.e., rumination, distraction) as a function of emotion goals among healthy participants and participants diagnosed with clinical depression. We focused on clinical depression because it is characterized by emotional dysfunction, in general, and by the maladaptive use of rumination, in particular (e.g., Joormann & Vanderlind, 2014; Nolen-Hoeksema et al., 2008). We hypothesized that compared to healthy individuals, individuals who are diagnosed with depression would be less likely to match emotion regulation strategies to emotion goals.

According to some theories regarding depressive rumination (e.g., Hertel, 2004; Watkins & Nolen-Hoeksema, 2014), depressed individuals engage in rumination automatically in response to negative affect. According to these theories, therefore, depressed individuals are expected to be more likely to select rumination,

Table 2
Using Emotion Goals to Predict Emotion Regulation Strategies in Study 4

	Emotion regulation strategy											
	Rumination			Distraction			Expressive suppression			Cognitive reappraisal		
Emotion regulation goal	γ	*SE*	*p*	γ	*SE*	*P*	γ	*SE*	*p*	γ	*SE*	*p*
Model 1: Decrease												
Intercept	3.02	.17	<.001	2.31	.14	<.001	2.80	.15	<.001	2.27	.15	<.001
Decrease negative emotion	.21	.17	.211	1.09	.16	<.001	.81	.16	<.001	.64	.15	<.001
Model 2: Increase												
Intercept	3.11	.12	<.001	3.04	.10	<.001	3.36	.12	<.001	2.70	.11	<.001
Increase/maintain negative emotion	2.06	.58	.005	−.87	.53	.108	−.64	.55	.243	−.14	.55	.796

Note. Separate models were run for each emotion regulation goal and strategy (eight models in total).

regardless of the goal of regulation. As this is the first investigation to assess selection of rumination as a function of goals among depressed individuals, we had the opportunity to empirically test this prediction. Specifically, we tested whether depressed individuals are more likely to choose rumination in response to negative stimuli, regardless of whether they are trying to increase or decrease their emotions.

Our design also allowed us to test the idea that depressed individuals are less flexible in emotion regulation, by assessing the extent to which depressed participants can flexibly match strategies to goals. There is evidence that depression is related to less flexibility in emotional processes, such that depressed individuals are less likely than nondepressed to modulate their reactions to match contextual demands (e.g., Rottenberg, Gross, & Gotlib, 2005). Adaptive emotion regulation requires the flexible use of emotion regulation strategies to fit the context (Bonanno & Burton, 2013). We extend these ideas to test whether depressed participants might be less flexible in selecting emotion regulation strategies that match their emotion goals. Evidence supporting this prediction would further demonstrate the clinical implications of our hypotheses.

Method

Participants. Participants were first prescreened for participation based on their score on the (BDI-II; Beck et al., 1996), administered online to a large sample of students ($n = 636$) 1–3 weeks prior to the study. Because of ethical review board instructions, we omitted the item "suicidal thoughts" from the screening procedure. Participants who scored either 16 or above or 9 or below on the BDI-II were invited to participate in the study (see Demiralp et al., 2012; Pe et al., 2015). During the laboratory session, to formally determine clinical status, we conducted clinical diagnostic interviews, by administering the gold-standard Structured Clinical Interview for *DSM–IV* Axis I Disorders (SCID-I; First, Spitzer, Gibbon, & Williams, 1997).

Consistent with the sample size in Study 3, we set the desired sample size to 30 in each group. Anticipating that some participants may not meet diagnostic criteria, we invited 81 participants to participate in the study, 32 participants who scored 9 or below on the BDI-II, and 49 participants who scored 16 or higher. The final sample included 58 students (40 women, 18 men, $M_{age} = 24.24$), who received course credit or the equivalent of $16 for participating.

Participants were considered depressed ($N = 28$, *MBDI-II* = 23.79, $SD = 6.19$) if they scored 16 or above on the BDI-II and were diagnosed with a current major depressive disorder or current dysthymic disorder, based on the clinical interview. We did not include participants who had a Bipolar I or II diagnosis or any psychotic disorder. Participants were considered nondepressed ($N = 30$, *MBDI-II* = 3.30, $SD = 2.15$) if they scored 9 or below on the BDI-II and were not currently diagnosed with any mental health disorder. Participants who met only one of the inclusion criteria were excluded.[11] The depressed and nondepressed groups did not differ significantly by age, $t(56) = -1.40$, $p = .167$, family status, $\chi^2(2) = 2.95$, $p = .228$, or gender, $\chi^2(1) = 1.72$, $p = .189$.

Procedure. The experiment included two sessions. In the first session, participants underwent a clinical diagnostic interview (i.e., the SCID-I; First et al., 1997) to determine their clinical status. The interviews were conducted by two trained clinical psychology graduate students and audiotaped. To assess the reliability of the diagnoses, each interviewer listened and provided independent diagnoses of 10% of the audio-taped interviews that they did not personally conduct (5% of depressed participants' interviews and 5% of nondepressed interviews), selected at random. The evaluators agreed on 100% of primary diagnoses, *kappa* = 1, $p < .001$, and on 92% of secondary diagnoses, *kappa* = 0.86, $p < .001$. During the first session, we collected additional information that was unrelated to the current research.

If participants met diagnostic criteria for participation in the study, they were invited to a second session, which took place within two weeks after the first session. During the second session, participants underwent the same procedure as in Study 3,[12] except that the task included 20 sad and 20 happy images. Participants completed 10 trials in which they were instructed to increase their reactions to sad images, 10 trials in which they were instructed to decrease their reactions to sad images, 10 trials in which they were instructed to increase their reactions to happy images, and 10 trials in which they were instructed to decrease their reactions to happy images. The order of blocks was counter balanced across participants. Finally, participants completed the same questionnaires as in Studies 2–3.[13]

Materials. Forty images[14] (20 sad and 20 happy) were used in the strategy selection task. We selected images from the IAPs (Lang et al., 2005), based on published norms (Lang et al., 2005; Mikels et al., 2005). We selected 11 sad images that were rated as inducing moderate sadness ($M_{sadness} = 4.20$, $SD = 1.76$), and nine additional sad images that were found to induce sadness in prior experiments ($M_{sadness} = 6.01$, $SD = 2.35$; e.g., Millgram et al., 2015; Vishkin et al., 2016). We selected 20 happy images that were rated as inducing moderate amusement and contentment ($M_{amusement} = 4.03$, $SD = 1.83$; $M_{content} = 4.10$, $SD = 1.63$).

Results and Discussion

Manipulation checks. To examine emotional reactions to the sad and happy images prior to regulation, we conducted a multivariate analysis of variance with group (depressed, nondepressed) as the independent variable and participants' mean ratings of sadness to sad images or happiness to happy images prior to regulation as the dependent variables. Both groups experienced moderate to high levels of sadness in response to the sad images. However, consistent with previous findings on blunted emotional reactivity in depression (e.g., Bylsma, Morris, & Rottenberg, 2008), depressed participants experienced relatively less sadness ($M = 5.37$) in response to the sad images, compared to the nondepressed participants ($M = 6.12$), $F(1, 56) = 5.09$, $p = .028$,

[11] One additional depressed participant was not included in the final analyses, as she experienced and expressed difficulties during the experiment and took more than 2.5 hours to complete it. The results reported below did not change when this participant was included in the analyses.

[12] In the second session, participants also completed a task on emotion regulation goals. This task was unrelated to the current investigation.

[13] As in Studies 2 and 3, trait rumination and distraction were unrelated to choices to use rumination and distraction as a function of goals, $r_s(57) < 0.213$, $p > 0.112$. Trait rumination and distraction and demographic variables such as age and gender did not moderated the results.

[14] Images used in Study 4 were a subset of the images used in Study 3.

$\eta_p^2 = 0.08$. With respect to the happy images, both groups experienced moderate to high levels of happiness in response to the happy images. However, depressed participants experienced less happiness ($M = 4.96$) in response to the happy images compared to the nondepressed participants ($M = 5.85$), $F(1, 56) = 5.85$, $p = .019$, $\eta_p^2 = 0.10$.

As in Studies 1–3, to confirm that participants used distraction and rumination appropriately, a rater who was blind to strategy selection rated participants' written descriptions of their strategy use. Participants used rumination appropriately on 93.8% of the trials in which rumination was selected and a written description of strategy use was provided and used distraction appropriately on 93.1% of the trials in which distraction was selected. Depressed and nondepressed participants did not differ in the percent of trials in which they used rumination appropriately (93.5% and 94% for depressed and nondepressed, respectively), $\chi^2(2) = 0.07$, $p = .965$. They also did not differ in the appropriate use of distraction, $\chi^2(2) = 2.70$, $p = .259$.

Finally, to confirm participants engaged in regulation in the expected direction, we subtracted image ratings before regulation, from image ratings after regulation, when participants were instructed to decrease, and when they were instructed to increase, their emotional reactions. When participants were instructed to decrease their responses, the average difference between pre- and postregulation ratings was negative, and significantly different from zero, $M = -1.28$, $t(57) = -8.11$, $p < .001$, indicating that participants effectively decreased their emotional reactions. When participants were instructed to increase their responses, the average difference between pre- and postregulation ratings was positive and significantly different from zero, $M = 0.74$, $t(57) = 4.98$, $p < .001$, indicating that participants increased their emotional reactions.

Strategy selection. To test whether depressed and nondepressed individuals differ in their strategy selection as a function of the emotion goal pursued, we conducted a repeated-measures ANOVA with group (depressed, nondepressed) and order of blocks as between-subjects factors, and image type (sad, happy) and goal (increase. decrease) as within-subject factors. Replicating Studies 2–3, we found a significant main effect for goal, $F(1, 54) = 154.72$, $p < .001$, $\eta_p^2 = 0.74$, such that when participants were instructed to decrease their emotional response they chose distraction on 72.4% of the trials (95% CI: [67.15, 77.65]), and when instructed to increase their emotional response they chose to use rumination on 76.6% of the trials (95% CI: [71.98, 81.11]). When instructed to decrease their emotional reactions, both depressed and nondepressed participants were more likely to choose distraction over rumination, $t_s < -4.13$, $ps < 0.001$. When instructed to increase their emotional reactions, both depressed and nondepressed participants were more likely to choose rumination over distraction, $t_s > 5.75$, $ps < 0.001$.

As expected, we found a significant Goal × Group interaction, $F(1, 54) = 6.65$, $p = .013$, $\eta_p^2 = 0.11$ (see Figure 6). When instructed to decrease their emotional response, depressed participants selected distraction (over rumination) less often (66.9%; 95% CI: [59.42, 74.51]) than did nondepressed participants (77.8%; 95% CI: [70.54, 85.12]), $F(1, 56) = 4.31$, $p = .043$, $\eta_p^2 = 0.07$. When instructed to increase their emotional response, depressed participants selected rumination (over distraction) less often (71.4%; 95% CI: [64.86, 77.99]) than did nondepressed participants (81.7%; (95% CI: [75.32, 88.01]), $F(1, 56) = 5.04$, $p = .029$, $\eta_p^2 = 0.08$. These results indicate that depressed participants were less likely than nondepressed participants to match strategies to goals, indicating reduced flexibility in emotion regulation strategy selection. Therefore, as predicted, difficulties in selecting strategies that optimize the attainment of emotion goals are related to emotional dysfunction.

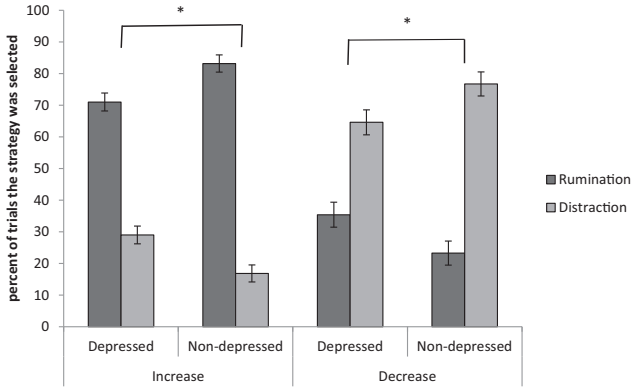

Figure 6. Percentage of choosing distraction and rumination as a function of emotion goal and depression. Error bars refer to +/−1 standard errors of the mean (Study 5).

To confirm that differences between groups were not driven by groups' differential emotional reactivity to the images, we repeated the analysis controlling for reactivity to sad and happy images. The Goal × Group interaction remained significant, $F(1, 54) = 6.36$, $p = .015$, $\eta_p^2 = 0.11$. There was also no Goal × Group × Image Type interaction, $F(1, 54) = 0.06$, $p = .805$, $\eta_p^2 < 0.01$, indicating that differences between groups did not vary by valence. The effects are also not likely to be attributed to group differences in the ability to implement distraction and rumination. As the results from Study 1 indicate, the efficacy of distraction and rumination for decreasing and increasing emotions did not differ as a function of dysphoria.

There was no significant main effect for group, $F(1, 56) = 0.005$, $p = .941$, $\eta_p^2 < 0.01$, indicating that depressed participants were not more likely to select rumination over distraction. There was also no significant Group × Image Type interaction, $F(1, 56) = 1.73$, $p = .194$, $\eta_p^2 = 0.03$, indicating that contrary to some theories regarding depressive rumination (e.g., Hertel, 2004; Watkins & Nolen-Hoeksema, 2014), depressed participants were not more likely to choose rumination in response to sad images compared to nondepressed participants. In fact, when instructed to increase their emotional reactions to sad images, depressed individuals were significantly less likely to choose rumination (76.07%; 95% CI: [69.64, 82.50]) compared to nondepressed (88.00%; 95% CI: [81.79, 94.21]), $F(1, 56) = 7.15$, $p = .010$, $\eta_p^2 = 0.11$. This finding indicates that depressed individuals do not rigidly select rumination, even in response to negative stimuli in particular.

We also found a significant Goal × Image Type interaction, $F(1, 54) = 11.06$, $p = .002$, $\eta_p^2 = 0.17$. Follow-up comparisons indicated that when instructed to increase their emotional reaction, participants chose more rumination in response to sad ($M = 82.04\%$) than happy ($M = 71.06\%$) images, $p = .001$. When instructed to decrease their emotional reaction, participants did not

differ in their selected strategy by image type, $p = .110$. There were no order effects, Fs < 1.44, ps > 0.235.

Strategy selection by emotion goal and the severity of depressive symptoms. If functional emotion regulation involves matching emotion regulation strategies to emotion goals, greater difficulties matching strategies to goals should be linked to greater difficulties in emotional functioning. To explore this possibility, we tested whether greater difficulties matching emotion regulation strategies to emotion goals was related to the severity of depressive symptoms. To assess flexible selection of strategies as a function of goals, we measured the degree to which participants matched strategies to their corresponding goals. We used a previously established measure of regulatory choice flexibility (cf. Levy-Gigi et al., 2016). Because the percent of trials in which rumination was selected fully complements the percent of trials distraction was selected, we calculated regulatory choice flexibility based on the percentages of rumination selection. Regulatory choice flexibility was calculated by subtracting the percent of trials in which participants were instructed to increase and chose rumination, from the percent of trials in which participants were instructed to decrease and chose rumination. A score of 100 represents maximal flexibility, such that rumination was selected in 100% of increase trials and 0% of decrease trials. The higher the regulatory choice flexibility score, the more likely the participant was to match rumination to increasing emotions and distraction to decreasing emotions. We then correlated this index with the number of depressive symptoms depressed participants reported having during the clinical interview. We found a negative and marginally significant correlation between regulatory choice flexibility and depressive symptoms, $r(28) = -0.340$, $p = .077$. The less flexible depressed participants were in matching emotion regulation strategies to emotion goals, the more depressive symptoms they tended to experience.

General Discussion

To attain their goals, people select means that are tailored for attaining these goals (e.g., Kruglanski et al., 2002). The current findings demonstrate that the same is true for emotion regulation. Our findings demonstrate, for the first time, that people select emotion regulation strategies (i.e., means) to effectively pursue their emotion goals. When their goal was to decrease emotions, people were more likely to choose strategies that are tailored for decreasing emotions, such as distraction. However, when their goal was to increase emotions, people were more likely to choose strategies that are tailored for increasing emotions, such as rumination. This pattern was evident in and outside the laboratory, as people regulated their emotions in daily life. The relationship between goals and strategies was also extended to other emotion regulation strategies, such as expressive suppression and cognitive reappraisal, which were related to the goal of decreasing emotions (Study 4). Our findings further demonstrate that emotion goals dictate the strategies people select when they regulate both negative and positive emotions (Study 3), and that choices to use emotion regulation strategies, such as distraction and rumination, reflect the degree to which these strategies were effective for decreasing and increasing emotional experiences (Study 1). Finally, we were able to show that the selection of emotion regulation strategies according to emotion goals may have important implications. Specifically, we found that people who experience emotional dysfunction (i.e., clinical depression) were less likely than healthy individuals to select strategies that match their emotion goals (Study 5).

Implications for Emotion Regulation

Most research on emotion regulation to date has focused on emotion regulation strategies, their selection and effectiveness. Research on strategy selection begun to identify contextual determinants of selecting emotion regulation strategies, pointing to emotional intensity as one contextual determinant (Sheppes et al., 2014). Our findings show that emotion goals are another contextual determinant that has been largely overlooked. What people want to achieve by regulating their emotions is critical for understanding why they choose one strategy over another.

Similarly, research on the effectiveness of emotion regulation strategies assessed efficacy in the context of decreasing negative affect (e.g., Kuehner, Huffziger, & Liebsch, 2009; Naragon-Gainey et al., 2017; Nolen-Hoeksema & Morrow, 1993). In this context distraction has been considered an effective strategy, whereas rumination has been considered an ineffective strategy (e.g., Bushman, 2002; Nolen-Hoeksema & Morrow, 1993; Ray et al., 2008). Consistent with the concept of emotion regulation flexibility (e.g., Bonanno & Burton, 2013), our findings demonstrate that emotion regulation strategies are not inherently effective or ineffective. Rather, their efficiency depends on context. For instance, distraction is ineffective for increasing emotional intensity, whereas rumination is effective for doing so.[15] As with the selection of emotion regulation strategies, their efficacy depends, among other things, on the goal they serve.

Some research on emotion regulation has also recognized the important role of emotion goals in shaping emotion regulation (Tamir, 2009, 2016). There is accumulating evidence to suggest that what people want to feel ultimately shapes their emotional experiences (e.g., Porat, Halperin, & Tamir, 2016). For instance, people who were motivated to decrease their anger ultimately felt less angry as a result (e.g., Porat et al., 2016). Our findings suggest that one way in which emotion goals shape emotional experiences is by shaping the selection of emotion regulation strategies. The emotion goal people pursue dictates the strategy selected, and the implementation of the strategy selected leads to congruent changes in emotional experience.

In addition to the contribution of our findings to the study of emotion regulation strategies and to the study of emotion goals, our research finally brings these two topics together. By studying both emotion goals and emotion regulation strategies, we were able to demonstrate that the two are inherently interdependent. We showed that emotion goals causally determine the emotion regulation strategy selected. We also showed that this interdependency is evident as people manage their emotions in response to personally relevant events in their daily life. Selecting strategies such as distraction or suppression to decrease emotions and rumination to increase emotions may seem an obvious pattern of strategy selection. However, as discussed above, establishing the causal role

[15] Although distraction was less effective than rumination for increasing emotional intensity, it was still capable of doing so. Similarly, rumination was still capable of reducing emotional intensity, albeit less effectively than distraction. These findings might explain why in certain instances some participants selected distraction to increase and rumination to decrease emotions.

emotion goals play in determining the selection of emotion regulation strategies has both theoretical and applied implications.

The idea that the selection of emotion regulation strategies depends on emotion goals means that understanding the goals people pursue may be important for predicting which strategy they select. Similarly, the strategy people use may help identify the emotion goal they pursue. For instance, research has tested individual differences in the frequency with which people use emotion regulation strategies, and the implications of these differences for well-being (e.g., Feldman, Joormann, & Johnson, 2008; Gross & John, 2003; Nolen-Hoeksema & Morrow, 1991; Quoidbach, Berry, Hansenne, & Mikolajczak, 2010). However, some of these individual differences could potentially be attributed to the pursuit of different emotion goals. People might be more or less likely to use a specific strategy either because of how they want to regulate their emotions (strategy) or because of what they want to feel as they regulate their emotions (goal). For example, our findings could suggest a novel perspective on the use of rumination, which when used excessively in response to negative events could lead to detrimental consequences (Nolen-Hoeksema et al., 2008). Assuming people select regulation strategies to pursue emotion goals, people should select rumination to increase emotions. Excessive use of rumination, therefore, may be partly driven by attempts to increase negative emotions. Taking the interdependency between goals and strategies into consideration could potentially lead to new insight into maladaptive patterns of strategy use.

Our findings also show that although most people proficiently match emotion regulation strategies to their emotion goals, people differ in their tendency to do so. Clinically depressed individuals were significantly less flexible than nondepressed individuals in selecting strategies to optimize the pursuit of their emotion goals. These findings demonstrate that the ability of select strategies according to goals in emotion regulation may carry not only theoretical, but also pragmatic implications.

Limitations and Future Directions

Our investigation has several limitations. To assess strategy selection as a function of goals we assessed the selection of distraction and rumination in the laboratory. To extend our focus to include additional emotion regulation strategies, we subsequently assessed the selection of expressive suppression and cognitive reappraisal, as a function of emotion goals in real life. However, our lab studies focused on distraction and rumination in particular, as prototypical strategies that are tailored to decrease and increase emotions (e.g., Gross & Thompson, 2007; Webb et al., 2012). Future research should test whether the patterns of selection of suppression and cognitive reappraisal observed in everyday life replicate when emotion goals are manipulated in the lab. This is especially true for cognitive reappraisal, which was found to be used in daily life for decreasing emotions but was unrelated to increasing emotions. This finding was unexpected, as cognitive reappraisal was previously demonstrated to be an effective strategy for both decreasing and increasing emotional intensity (e.g., Ochsner et al., 2004). It could be the case, that when people attempt to increase negative emotions in real life they have other means at their disposal (e.g., rumination), which are more readily available and less effortful than reappraisal. Future research should test this and additional accounts.

Similarly, we focused on decreasing and increasing negative and positive emotions as generally broad emotion goals. However, emotion goals include increasing or decreasing various emotional states. Future research could test whether and how different emotion goals shape the selection of different emotion regulation strategies.

Our investigation also focused on the deliberate selection of emotion regulation strategies. However, emotion regulation is not always deliberate (e.g., Mauss, Bunge, & Gross, 2007). Future research could test whether the interdependency of goals and strategies is equally evident in deliberate and automatic emotion regulation. Relatedly, an important task for future research might be to reveal how people learn the associations between specific emotion goals and specific emotion regulation strategies. Future research could also benefit from using physiological measures to track the affective implications of selecting strategies according to emotion goals.

Finally, future research should explore the possible implications of our findings for emotion regulation in depression. Contrary to the idea that depressed individuals engage in rumination automatically in response to negative affect (e.g., Hertel, 2004; Watkins & Nolen-Hoeksema, 2014), we showed that depressed individuals do not rigidly select rumination to regulate emotions. In fact, depressed individuals were even *less* likely than nondepressed to select rumination to increase emotions, even when the emotions they were trying to increase were negative. This indicates that depressed individuals do not necessarily select rumination when reacting to negative emotional experiences. Our findings demonstrate, however, that depressed individuals may be less flexible than nondepressed in matching emotion regulation strategies to emotion goals. Further research is needed to understand the mechanisms and potential implications of these findings for understanding emotion regulation difficulties in depression.

Context of the Research

The ideas for this investigation originated from a consideration of emotion regulation from a motivational approach (see Tamir & Millgram, 2017). As a form of self-regulation, emotion regulation is inherently a motivated process. Therefore, basic insights in motivational science should apply to emotion regulation as well, including the dependency between ends and the means used to attain them. We therefore tested whether, similar to other motivational processes, emotion goals shape the emotion regulation strategies people select. In the future, we hope to explore the implications of this dependency for emotion regulation outcomes, psychopathology and well-being.

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